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Practical Recommendations for Utilizing a Range of Instructional Approaches in General Education Settings

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Students with autism spectrum disorders present a unique challenge to educators. There is considerable heterogeneity among this population, which means that each individual may need qualitatively and quantitatively different levels of educational and behavioral support. As a result of this variability, students with autism spectrum disorders are educated anywhere along the placement continuum from specialized programs to general education classrooms.

An abundance of intervention strategies exist, some of which have not been empirically supported. A feature of many of the most utilized treatment approaches is their implementation in clinics or specialized settings, and apparent lack of applicability to less restrictive educational environments. The purpose of this paper is to describe selected interventions and consider the compatibility of these interventions with general education placement.

Interventions

A wide variety of interventions exist for children with autism spectrum disorders and can be tailored to meet the needs of the individual student. Interventions can range from being highly structured and adult-driven to child-directed, or anywhere in-between. The listings below are intended to serve only as a brief example of a few of the more commonly known available interventions, including discrete trial teaching, pivotal response training, videotaped self-modeling, and Division TEACCH. The list is not intended to be inclusive of all potential approaches.

Discrete Trial Teaching

Discrete trial teaching (DTT) is an intervention method based on the principles of operant learning theory. Promoted by O. Ivar Lovaas from the University of California, Los Angeles, discrete trial teaching is used to teach a variety of skills in domains including cognitive, communication, play, social, and self-help skills (Leaf & McEachin, 1999). Today there are various interpretations of the use of discrete trial teaching. Discrete trial teaching is also referred to as Applied Behavior Analysis (ABA).

Leaf and McEachin described the components used in discrete trial teaching. According to Leaf and McEachin (1999), the basic principles of DTT including breaking a skill down to its component parts, allowing repeated practice, providing prompting and fading, and using reinforcement. Prompts are utilized and then faded out, and reinforcement procedures are used. Leaf and McEachin added that DTT is appropriate to use with all ages and with diverse populations.

Families participating in a strict DTT/ABA program engage their child in 35-40 hours per week of intensive behavior intervention, based on operant techniques and the shaping of behavior through reinforcement of successive approximations, prompting and fading procedures, and the use of positive reinforcers that are functional. This highly structured one-to-one teaching approach focuses on maximizing success and minimizing failure, while using a variety of reinforcers to maintain motivation.

While utilizing behavior techniques associated with the science of applied behavior analysis is rather common in classroom settings, employing the use of strict one-on-one discrete trial teaching style therapy may be more challenging and limiting. Initially, skills may need to be taught in a more specialized setting, but then skills must be introduced and taught within the context of the general education and other typical settings. For example, when a child learns to respond to simple social questions ("How are you?" or "What's your name?"), the classroom assistant or teacher will then contrive situations in which the child must use these phrases with other adults or classmates.

Although a child may need pullout services for a short period during the day or after school for skill acquisition, applying these skills in natural settings is crucial for generalization. If the teacher is kept current with the child's programming and understands the procedures associated with discrete trial teaching, trials can easily be integrated into curriculum.

Pivotal Response Training. Another technique using discrete trial training is Pivotal Response Training (PRT). Whereas Lovaas incorporates a more specific and rigid method of discrete trial teaching, pivotal response training uses pivotal or motivational trials (Koegel, Koegel, & Carter, 1999). Robert and Lynn Koegel and their colleagues at the Autism Research Center at the University of California at Santa Barbara found Lovaas-developed methods of discrete trial teaching "laborious," and "behaviors often failed to be exhibited in other settings or in response to items that were not specifically taught" (Koegel, Koegel & Carter, 1999). Concerned about the lack ofgeneralizability of skills taught via discrete trial teaching and lack of motivation in children with autism spectrum disorders to learn new tasks (Stahmer, 1999), Koegel and Koegel and colleagues developed PRT.

Pivotal Response Training emphasizes key pivotal skills, asserting that students who learn pivotal skills will generalize them to other areas (Koegel, R.L. et al., 1999; Koegel & Koegel, 1995; Koegel, L.K. et al., 1992). Pivotal behaviors are those that are central to a wide range of functioning, including motivation, responsivity to multiple cues, child self-initiation, and self-management (Koegel, R.L. et al, 1989). Increased motivation, for example, may lead to a dramatic effect upon children's learning (Koegel, R.L., O'Dell, & Dunlap 1988). An increase in motivation may in turn significantly increase and improve speech in students with autism spectrum disorders (Koegel, R.L., 1989).

In order to implement pivotal response training in the classroom setting, Koegel and Koegel and their colleagues recommend incorporating five variables into the existing school environment. These five variables include teaching interactions by promoting choice, varying tasks and interspersing maintenance tasks, reinforcing attempts, using natural reinforcers, and developing self-initiated learning interactions (Koegel, Koegel, & Carter, 1999). These variables are designed to improve motivation in the classroom, including widespread benefits across a number of academic and social behaviors, and with concomitant decreases in disruptive behaviors (Koegel, Koegel, & Carter, 1999, Kern & Dunlap, 1998).

Child choice includes the use of child-chosen or child preferred materials in teaching tasks. Incorporating choice as a curricular intervention can decrease undesirable behavior in the classroom (Kern & Dunlap, 1998). Child choice can be incorporated into the majority of academic activities (Koegel, Koegel, & Carter, 1999). This may consist of allowing children to select materials for a given subject, to choose the order of completing worksheets, or by allowing the child to choose his or her own seat. Additionally, parents may be encouraged to incorporate child choice into homework completion time. An increase in motivation to initiate and complete homework assignments can be accomplished by allowing children choice as to the order for completing tasks, the writing implements used, the location in the house in which the work is conducted, and other ideas (Koegel, Koegel, & Carter, 1999).

The lack of motivation apparent in children with autism spectrum disorders may be the result of recurring failure at tasks (Koegel, Koegel, & Carter, 1999). To reduce the number of failures in an instructional period, PRT involves

randomly and frequently interspersing new tasks with previously mastered items (Koegel, Koegel, & Carter, 1999). When introducing a new number to a child with an autism spectrum disorder, for example, it may prove helpful to include a review of some numbers the child knows well. Rather than starting with a review and finishing with the new item, mixing the novel and mastered items throughout the trial will likely guarantee at least some success.

Contrary to many behavior interventions, practitioners of PRT reinforce all attempts in which the child appears to be trying, even if the response is incorrect. This will increase the likelihood of future responding to tasks and improve the child's learning during social and academic tasks (Koegel, Koegel, & Carter, 1999). Reinforcing attempts may include using phrases like "good try". Some reinforcers are more beneficial to the child than others. Using naturally occurring, intrinsically reinforcing consequences rather than arbitrary reinforcers, for example, may increase motivation and rate of learning (Koegel, Koegel, & Carter, 1999). A natural reinforcer is one that is directly related to the task at hand. If a child says, "I want a cookie," receipt of the cookie is a direct, natural reinforcer. If the child were to request the cookie and, as a consequence of appropriately using language, received something else (e.g., verbal praise), he or she would not likely associate the consequence with his or her own responding. Receiving a cookie, however, is a clear result of the verbal request.

Children with autism spectrum disorders often avoid social and learning opportunities outside of their areas of intense interest, while typically developing children more often actively seek out such occasions (Koegel, Koegel, & Carter, 1999). Children with autism spectrum disorders lack spontaneous initiations, especially question asking and other verbal initiations. When systematically taught to inquire about highly reinforcing child-choice items, children with autism spectrum disorders were able to generalize this skill (Koegel, Koegel, & Carter, 1999).

TEACCH. Pivotal response training is not the only approach with an emphasis on increasing motivation in children with autism spectrum disorders. The Treatment and Education of Autistic Children and Related Communication Handicapped Children (TEACCH), an approach centered on Structured Teaching, is based at the University of North Carolina at Chapel Hill. TEACCH describes its approach as "a comprehensive educational program with an emphasis on developing both motivation and skills in a wide range of curriculum areas." TEACCH interventions target presumed strengths in students with autism spectrum disorders (Mesibov et al, 1994) and focus on designing accommodations to address inherent difficulties. Community outings and integrated playgroups are used to foster generalization of learning to larger group settings.

The TEACCH model is guided by seven principles (Schopler, 1994). These include promoting adaptation by improving the individual's skills and developing environmental adaptations; emphasizing parental collaboration; conducting formal and informal evaluations for developing an individualized education program; utilizing cognitive and behavior therapy as intervention strategies; enhancing skills and accepting deficits in both children and parents; using visual cues to compensate for auditory processing problems; and utilizing a holistic orientation with multi-disciplinary training (Schopler, 1998; Olley, 1999).

Gary Mesibov, the Director of Division TEACCH, and his colleagues offer several suggestions for using Structured Teaching in the classroom setting (1994). Before teaching commences, structure is established in the instructional environment. Specific recommendations concern the physical organization of the classroom (physical lay-out, selecting work areas, and boundaries), creating schedules, developing individual work systems, implementing visual structure, and teaching students to follow routines (Mesibov et al, 1994). These suggestions are discussed in detail below, followed by a brief description of the Structured Teaching method.

Careful physical organization of the classroom enables the student with an autism spectrum disorder to better understand their environments and relationships between events (Mesibov et al, 1994). Work areas for students with autism spectrum disorders should be free from distractions (Schopler, Reichler, & Lansing, 1980). Facing students' desks toward a blank wall may eliminate many distractions and help students to attend to the relevant

dimensions of their work activities and instruction (Mesibov et al, 1994). The individual needs of the student should be considered when selecting a classroom environment. For the student who is learning to use the toilet independently, for example, it is ideal to place the child in a classroom near the restrooms. Students with autism spectrum disorders may benefit from a transitional area, where all of the activity schedules are placed (Mesibov et al, 1994). Students go to the transition area to learn what the next activity will be.

For many students with autism spectrum disorders, clearly outlined boundaries may be useful. This may include pieces of tape on the floor indicating proper chair placement at a work station, the use of partitions to separate desks, or designating the carpeted portion of the classroom as a free-time area. As students function more independently, the amount of physical structure in the environment is tapered (Mesibov et al, 1994).

Like physical organization, schedules assist individuals with autism spectrum disorders in understanding their environment. "Developing visually clear schedules for students that each understands at his or her own level of ability allows a teacher to communicate which discrete events will occur during the school day, when they can be expected to occur, and how they are related to one another (e.g., first work and then play)" (p.198, Mesibov et al, 1994). Visually clear schedules assist students with autism spectrum disorders with sequential memory and time organization, reinforce oral directions that may be difficult to understand, and compensate for attentional problems by providing visual reminders of upcoming activities (Mesibov et al, 1994).

Similar to a schedule, an individual work system provides each student with the specifics of what he or she should do while working independently. These systems provide the student with four pieces of information: what work to do; how much work to do; how they will know when they have finished; and what will happen when they are finished (Mesibov et al, 1994). An individual work system promotes the child's ability to work independently. However, work systems should not be misinterpreted as curriculum.

Many children with autism spectrum disorders do well with visually presented tasks (Mesibov et al, 1994). Visual tasks are more concrete and easier for the student with autism spectrum disorders to understand, and students often rely on visual teaching methods (Scott, Clark, & Brady, 2000). Additionally, students with autism spectrum disorders may be more likely to attend to instruction if it is visually interesting (Mesibov et al, 1994). For example, a student may be more successful with a sorting task if the stimuli to be sorted include objects with patterns or colors the student enjoys. Also, color-coding the students' materials is often helpful. This may include using yellow electrical tape to designate the child's assigned seat for circle time or a yellow hook for the student's book bag.

Visually organizing information helps students to process information more efficiently (Mesibov et al, 1994). When asked to clean large windows, for example, the student with autism spectrum disorders may be overwhelmed and unable to start. Dividing the large window into four smaller sections makes the space smaller and more manageable.

Another useful aid in the classroom involves the use of visual instructions. These visual instructions frequently include the use of a visual representation of the task and how it is to be completed, using an item known as a "jig" (Mesibov et al, 1994). Jigs are especially useful for promoting independence in community-based settings without direct adult supervision. They provide an unambiguous way of understanding the task expectation.

The establishment of routine is the final method of incorporating structure into the school environment discussed. Because these individuals struggle to understand the requirements of specific situations and often cannot easily or effectively organize themselves, students with autism spectrum disorders benefit from learning systematic and consistent ways of completing tasks (Mesibov et al, 1994). As with the window-washing example, children with autism spectrum disorders are often immobilized when confronting demands. Learning to approach assignments in a left-to-right, top-to-bottom sequence gives them a systematic approach to a multitude of tasks. Independently,

students with autism spectrum disorders develop and follow their private routines or compulsions. It is useful to redirect this tendency toward productive activities (Mesibov et al, 1994).

Once structure is established in the classroom, tasks can be taught in a structured manner. The use of clear directions, prompts, and reinforcers are essential to Structured Teaching (Mesibov et al, 1994). For students who have difficulty processing receptive language, telegraphing language is recommended (Mesibov et al, 1994). For example, rather than saying, "Tom, Come on. Put these blocks back into the container over there. You know what to do. Then, put it back on the shelf. Go ahead. You can't go play with the toys until you're done", the teacher may simply say, "Clean up. Then play". Telegraphed speech is more likely to be understood by the student with an autism spectrum disorder and can be individualized to each student's level of functioning (Mesibov et al, 1994).

Verbal, physical, modeling and gestural prompts are also recommended to increase student success. Prompts should be used consistently and clearly before the student makes an incorrect response. When possible, prompts should be gradually eliminated and ultimately the student should respond unaided (Schreibman, 1994). If this does not occur, the student may become prompt dependent and unable to correctly respond without the established prompt. When working with students with autism spectrum disorders, unintentional prompting often occurs (Mesibov et al, 1994). The student may respond to unintended cues, rather than to the issued directive. For example, a teacher widens her eyes when presenting a picture of a "big" circle and attempts to elicit the response of "big ball" from the student. The student says "big" because she sees her teacher widen her eyes and not because of the picture.

Finally, Structured Teaching involves motivating students to work with desired activities or items. The necessary amount of external reinforcement is individual to the child. Some students with autism spectrum disorders are highly motivated by completing assignments for their own sake, but most require further incentive.

Like pivotal response training, TEACCH encourages the use of natural reinforcers (Mesibov et al, 1994) and recommends coupling tangible reinforcers with social reinforcers and verbal praise. In order for the child to associate the reinforcer with the behavior, the reinforcer must initially occur immediately following the desired behavior. As the student progresses, the schedule and type of reinforcer can evolve (Mesibov et al, 1994).

Videotaped Self-Modeling. In contrast to the previous instructional approaches, Videotaped Self-Modeling (VSM) is based on the principles of social learning theory. The age, sex, and similarity of a model to the observer are important factors in modeling (Bandura, 1969). Optimal characteristics of models include similarity to the subject in terms of race, age, attitudes and social background; display of similar problems and concerns as the subject; and exhibition of slightly higher levels of competence. Given these optimal characteristics, it follows that using an image of ones' self as a model would be an effective means of altering behavior. This is the rationale behind the VSM approach.

Buggey (1995a) defines Videotaped Self-Modeling as "…a procedure by which children are allowed to view themselves functioning at a slightly higher level than their normal ability through the creative use of videotaping and editing procedures" (p.39). The process involves identifying a target behavior for change and then determining an alternative appropriate behavior. The child is then videotaped in either a role-playing situation or in the natural setting. The tape is edited to show only the desired alternative appropriate behaviors. If a desired behavior occurs at a very low frequency, it may be necessary to use role-playing in order to have an adequate sample of positive behavior (Buggey, 1999).

VSM is particularly appealing to use with people with autism spectrum disorders because it does not require human interaction (children with autism tend to relate to objects better than people), it utilizes visual learning, it is predictable, and it is easy to control (Buggey, Toombs, Gardener, and Cervetti, 1999). Charlop-Christy, Le, and Freeman (2000) compared the effectiveness of video modeling to in vivo or live modeling. Each of the five

participants had different target behaviors. For four of the children, video modeling led to quicker acquisition and better generalization of skills compared to in vivo modeling. They added that video modeling was cheaper and less time consuming than in vivo modeling. Charlop-Christy et al. (2000) further explained that children with autism tend to enjoy watching television, and consequently are more motivated to learn off a video than from a live person.

VSM has been used to effectively treat a variety of disorders and problem behaviors from disruptive classroom behaviors (Kehle, Clark, Jenson, & Wampold, 1986; Lonnecker, Brady, McPherson, and Hawkins, 1994) to academic skills (Schunk & Hanson, 1989). Studies have investigated the use of VSM with children with autism spectrum disorders. For example, Buggey et al. (1999) conducted a study to see if the use of VSM would increase appropriate verbal responding in a sample of three children with autism and found an increased level of appropriate responding after the VSM treatment in all participants. Bellini (2000) used VSM with role-playing and training in recognizing thoughts and feelings to improve the social skills and reduce anxiety and depression in a fourth grade student with PDD-NOS. Posttest measures indicated lower levels of anxiety and depression, and increased social interaction in the child diagnosed with a pervasive developmental disorder.

Other research that examined the use of VSM indicates that the use of this intervention strategy may not be appropriate for preschool age children. Buggey (1995b) investigated the use of VSM to improve the expressive language development of two preschool children with language delays. One child showed no significant improvements; however, the other participant did make significant qualitative and quantitative improvements. Clark, Beck, Sloane, Goldsmith, Jenson, Bowen, and Kehle (1993) conducted a study to see whether VSM would decrease aggressive and noncompliant behaviors in preschool children. Clark et al. (1993) were unable to find significant differences in the behavior of preschoolers after VSM treatment. According to Bandura (1971), four processes are involved in delayed modeling: attention, retention, motor reproduction, and motivation. Considering the skills necessary to model a behavior, it may not be developmentally appropriate to use VSM with preschool age children because of their short attention span, cognitive immaturity, and under-developed motor skills.

The majority of research using VSM indicates that this method is effective in eliciting positive behavioral changes. In most VSM studies, positive behavior was achieved quickly and was still evident in follow-up evaluations. In addition, the desired responses were generalized across situations (Buggey, 1999). According to Buggey (1995a), "children's confidence and self-rated ability on a task tends to increase as a function of viewing their own success" (p.41).

Videotaped Self-Modeling has been shown to be effective in eliciting behavioral change in the classroom settings (Kehle, Clark, Jenson, & Wampold, 1986; Lonnecker, Brady, McPherson, & Hawkins, 1994). It is particularly appropriate for use in school settings for several reasons. First, it typically does not require specialized training of teachers or staff. Second, because the child is filmed in the classroom setting, the generalization of skills is more likely to occur. Third, research indicates that VSM can be used effectively to address a variety of behaviors from academic skills to aggression. Fourth, it does not require a lot of time or effort on the part of the teacher to implement. Finally, VSM is considered a positive behavioral support, because inappropriate behaviors are ignored, while positive behaviors are emphasized (Buggey, 1999).

Summary and Conclusions

The skill and ability to merge effective practices to benefit children with autism spectrum disorders in the general education setting is the art of good teaching. And many of the strategies promoted for students across the autism spectrum, will benefit other children as well. Robert and Lynn Koegel (1995) have complied a highly useful list of clinical factors professionals should consider when choosing intervention approaches and when working with students with autism spectrum disorders:

1. There is ***variability*** in symptomatology and responsiveness to intervention across children; therefore, all intervention should be individualized.
2. The earliest possible intervention should be considered to aid in the ***prevention*** of the emergence of severe problems.
3. Intervention should take place primarily in the ***natural environment***.
4. The child's ***motivation*** to overcome his or her disability should be promoted.
5. Analyses of the ***functions*** of the child's behavior need to be conducted.
6. ***Full school and community inclusion*** needs to be planned and implemented throughout the lifespan.
7. ***Parental participation*** is important.
8. ***Generalization and maintenance*** of intervention gains need to be planned and evaluated.
9. ***Coordination*** among individual providers, educators, and parents enhances the child's progress.
10. The child's ***independence*** needs to be promoted.
11. The ***social significance*** of the intervention for the child's and the family's quality of life needs to be considered.

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